Remarks

Claims 1, 9, 14, and 24-66 are pending in the application. Claims 44-51 are allowed, and claims 30, 43, and 66 contain allowable subject matter but are objected to for depending from a rejected base claim. Claims 1, 9, 14, 24-29, 31-42, and 52-65 are rejected.

Applicants have amended claims 1, 24, 35, and 57, and added new claims 67-80. Claims 9, 14, 30, 37, 38, 43, 52-56, 59, 60, and 66 have been cancelled. Upon entry of the amendments, claims 1, 24-29, 31-36, 39-42, 44-51, 57, 58, 60-65, and 67-80 remain pending in the application.

Support for the amendments to claim 1 is found in the specification as filed, for example in Figures 1a-1c and at page 6, lines 26ff. Support for the amendment to claims 24, 35, and 57 are found in original claims 30, 43, and 66 respectively. Support for new claims 68-73 are found in the original claims, and in the specification, for example at page 1, lines 25-26, and page 2, lines 12ff. Support for new claims 74-80 can be found in the original claims 24-29, and in the specification, for example at page 2, lines 12ff. Applicants respectfully request entry of the amendments.

Telephonic Interview with Examiner Brittain

Applicants would like to thank Examiner Brittain for the courtesies extended to inventor Enbody and Applicants' representative in a telephonic interview on January 6, 2003. During the interview, amendments such as are offered with this reply were discussed.

Rejections Under 35 U.S.C. § 112

Claims 1, 37, and 38 are rejected under 35 U.S.C. § 112 for lack of written description support. Similarly, claims 37, 38, 59, and 60 are rejected are under 35 U.S.C. § 112, first paragraph as being unsupported by an enabling description. Applicants have cancelled claims 37,

38, 59 and 60. Further, Applicants have amended claim 1 to remove the limitation of "without requiring the degradation of said nanotubes". For these reasons, Applicants respectfully request the rejection under § 112 be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 9, 24-29, 31-34, and 52-56 stand rejected under 35 U.S.C. § 103 as obvious over Ihara, et al, U.S. Patent 5,464,987 (the Ihara reference) in view of the Yakobson article. Applicants respectfully traverse the rejection as applied to the amended claims and request reconsideration.

Applicants have cancelled claim 9 and claims 52-56. Further, Applicants have amended claim 24 to incorporate the allowable subject matter of claim 30. Amended claim 24 is thus allowable over the cited art, while claims 25-29 and 31-34 depend from claim 24. For these reasons, Applicants respectfully request that the rejection as drawn to claims 9, 24-29, 31-34, and 52-56 be withdrawn.

As to claim 1, Applicants have amended the claim to recite structure that differentiates it from the structure disclosed in the Ihara reference. Specifically, Applicants have amended claim 1 to recite that the extending nanotubes from each element are disposed so as to become mechanically interconnected as the first and second fastening elements are joined by advancing toward each other. The process of joining the first and second fastening elements by advancing them toward each other is illustrated, for example, in Figures 1a-1c. The extending nanotubes are represented schematically as elements 12 and 12'. Figures 1a-1c show that the fastening elements become mechanically interconnected as the elements are advanced toward each other. Initial contact is shown in Figure 1b, and a mechanical interconnection is shown in Figure 1c. The nanotubes of the respective fastening elements are able to become mechanically interconnected

because they are disposed on the substrate in such a way that the process of advancing the elements toward one another and contacting the elements with each other results in the mechanical connection.

Applicants respectfully submit that "the nanotubes are disposed so as to become mechanically interconnected" is a structural limitation that distinguishes the structure of the current claims from the disclosure of the Ihara reference. To effect a mechanical interconnection as the elements are advanced toward each other, the extending nanotubes need to have certain configurations, or dispositions, that are not disclosed in the Ihara reference. Among other things, at least some of the extending nanotubes should be functionalized so as to contain bent portions such as illustrated by the non-limiting examples of hooks, loops, and spirals. Importantly, at least some of the extending nanotubes must be attached to the surface at only one end, so that an end is free standing and is capable of becoming mechanically interconnected with an extending nanotube on the other fastening element.

The invention as claimed in amended claim 1 is different from the structure disclosed in the Ihara reference. In Figure 10, the Ihara reference discloses structures with interlocking half tori. Such interlocking half tori are not capable of becoming mechanically interconnected upon joining of the elements by advancing toward each other, as illustrated in Figures 1a-1c of the current application. The reason the structure of Ihara is incapable of becoming mechanically interconnected is that the extending nanotubes of the Ihara reference are not disposed so as to allow such mechanical interconnection.

The difference in structure between the claims and the Ihara reference is also reflected in the limitation that the nanotubes have a free standing end. Ihara has welding at two ends. The extending nanotubes of the invention have welding at only one end. Because the extending

nanotubes of claim 1 are "welded" only at one end, they may become mechanically interconnected as fastening elements containing the extending nanotubes are advanced towards one another as shown in Figures 1a, 1b, and 1c. The nanotubes of Ihara, on the other hand, which are welded at both ends, cannot become mechanically interconnected as they are advanced toward one another.

Based on the discussion above, Applicants believe that the structure recited in claim 1 distinguishes over the structure disclosed in the Ihara reference. For this reason, Applicants respectfully urge the Examiner to be withdraw the rejection as applied to amended claim 1.

New Claims 67-80

New claim 67 depends from amended claim 1 and further describes the nanotubes as having a free standing end free of the surface of the substrate. Because it depends from an allowable claim 1, Applicants respectfully submit that claim 67 is also allowable.

New independent claims 68 and 74 are offered to further describe and claim the invention. Both independent claims include the limitation that the nanotubes are disposed so as to become mechanically interconnected as the elements are advanced toward one another. As noted above in the discussion of amended claim 1, Applicants believe that this structural limitation suffices to distinguish the claimed inventions of claims 68 and 74 from the disclosure of the Ihara reference. Claims 69-73 are dependent from claim 68, and claims 75-80 are dependent from claim 74. Because those claims depend from allowable claims, Applicants respectfully submit they are also in a state of allowance. For the reasons discussed above, Applicants respectfully request that new claims 67-80 be passed to a state of allowability.

CONCLUSION

For the reasons discussed above, Applicants believe that claims 1, 24-29, 31-36, 39-42, 44-51, 57, 58, 60-65, and 67-80 are in an allowable state and respectfully request an early notice of such allowance. The Examiner is invited to telephone the undersigned if that would be helpful to resolving any issue.

Respectfully submitted,

Date: Jan 6, 2003 By: Mark A. Frentrup

Monte L. Falcoff, Reg. No. 37,617
Mark A. Frentrup, Reg. No. 41,026
Attorneys for Applicants

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

MLF/MAF/bd